A. What is the Historical Pattern of Productivity Change in the Cable Industry?

The Commission pointed out in the Notice that a one factor index, such as output per man hour, is the simplest measure of productivity. However, there are conceptual difficulties with this simplistic approach. For example, labor productivity will rise if output rises due to capital expenditure increases. However, the firm's overall productivity will not increase by the same amount because of the increased capital expense. Therefore, a total factor approach to productivity measurement is likely to be superior to other measures.[6]

Acquiring the necessary data to perform a total factor productivity study and then generating results is a difficult task.[7] Such an undertaking is certainly not possible in the time allowed for this proceeding. Without quantitative evidence, the Commission is not in a position to require a productivity offset greater than the one already implicit in the use of the GNP-PI in the price cap formula.[8]

Mr. Townsend does not address in a meaningful fashion the quantitative issues raised by the Commission in the Notice. Instead, he discusses in general and subjective terms various reasons why cable industry productivity may have increased and may increase in the future. The issue in this proceeding is not whether cable industry productivity has increased.

---

[6] See Thomas C. Spavins, An Introduction to the Economics of Price Cap Regulation, January 31, 1990. Also see the Statement of Mark Schankerman, filed with Comments of GTE, p. 3.

[7] See the Statement of David Roddy, Appendix 3, pp. 4-5, and the references cited there.

[8] The GNP-PI reflects average productivity gains in the economy. See Spavins, p. 13.

It most certainly has. The relevant issue is whether the rate of productivity change has exceeded the rate in the economy generally, and if so, by exactly how much.[9]

Even the qualitative analysis provided by Mr. Townsend is flawed. For example, he claims that "increases in subscribership entail relatively few additional costs," since "one of the major costs of providing cable service is laying the cable in the first place."[10] He is alluding to the broadcast nature of the signal that provides basic cable television service. This means new customers do not consume switch ports, require individual channel capacity, and the like. But this analysis ignores the need to add new subscribers, to bill for service, and to allow for other customer interactions.

Mr. Townsend dwells at length on the additional channel capacity being enabled by the deployment of "glass" and compression technology. This is true, but it may have little to do with increasing the productivity of today's broadcast television service. A common misimpression by people who hear of the pending 200-500 channel systems is that those channels will be used to deliver dramatically more programming to every home on a broadcast basis. In fact, the real significance of being able to carry such a large number of channels is that they can be used to provide programs to individual homes on a subscriber demand basis.

With 200-500 channels available to a cluster of a few hundred homes, there will be on the order of a channel per home for delivery of programs on a customized or highly

---

[9] The critical question of whether rates of productivity change can be sustained in the near future is discussed in the next section.

[10] P. 3.

targeted basis. The productivity of delivering such services is likely to be quite different than that of program television. Moreover, one cannot simply conclude that the new technologies will increase productivity of the services offered today.

Finally, Mr. Townsend attributes to regulated services productivity increases that should be attributed to unregulated services. For example, he points out that "[c]ompression will also sharply reduce the cost of delivering programming to the headend...."[11] Whether or not this is entirely accurate, it will be the cost of unregulated programming that will be impacted. Furthermore, any efficiencies in the programming market will automatically be reflected in regulated rates because changes in programming cost are treated as an external factor in the productivity formula.

As the above discussion demonstrates, Mr. Townsend's discussion of cable industry productivity is flawed in a number of respects. His analysis is even less useful for the critical issue of establishing likely future productivity trends.

C. Can Historical Productivity Trends Be Projected Into the Future?

Although Mr. Townsend has overstated the productivity gains from adding subscribers and channels, there is no doubt that there have been such gains. Even if these gains were to be reduced to a useful quantitative estimate, the Commission would have to have a basis for believing that they would continue at the same level in the future. It is unlikely that historical gains will continue at the same rate.

---

[11] Para. 10.

Much of the historical gain in productivity for the cable industry is due to realizing economies of fill and economies of scale.[12] As the industry matures, these sources of productivity increase will become less important. In the Commission's AT&T price cap Proceeding, Laurits Christensen pointed out that:

> smaller firms tend to be able to exploit higher returns to scale than larger firms, and thus when their output grows their unit costs will drop more rapidly than for large firms. Hence, large firms will tend to have a higher level of productivity but a lower rate of growth of productivity.[13]

In other words, as firms grow into their markets, productivity increases become harder to sustain. Cable systems now pass 96 percent of all homes, and almost two thirds of homes passed.[14] As a result, any large increases in productivity achieved by increasing the number of subscribers are largely completed at this point. To the extent that LEC Video Dial Tone offerings provide additional alternatives to potential cable subscribers, the growth in penetration might be expected to slow even further.

As for productivity increases that might flow from increasing the number of channels carried, the Commission has indicated that it is considering ways to reflect the effect of channel additions or deletions on price capped rates.[15] As discussed above, channel availabil-

---

[12] Economies of fill result from more intensive use of a given system; economies of scale are the result of increasing overall system size.

[13] See Statement of Dr. Laurits R. Christensen, Productivity Adjustment in the Price Cap Proposal, filed by AT&T in CC Docket No. 87-313, .

[14] See National Cable Television Association, Cable Television Facts, June 1993, p. 1-A.

[15] See Third Notice of Proposed Rulemaking, paras. 133-144. To the extent a significant fraction of future cable industry productivity change might be attributed to this factor, the appropriateness of requiring even average economy-wide productivity gains to be flowed

ity in most systems is already well in excess of the number being used for basic and cable programming service. Depending upon how the provision of cable service evolves under regulation, any further gains in channel capacity due to the deployment of fiber optics and compression may largely accrue to the benefit of new video and non-video services. Therefore, the productivity of existing regulated services might not be greatly impacted.

One might argue that increasing channel capacity in a given system would lead to a substantially lower cost of the basic service channel component of that system, implying a resulting increase in productivity. But given the cost of the compression technology, and other equipment required to derive the benefits of the increased capacity, we are not aware that any such reduction has been projected, nor does Mr. Townsend attempt to make this argument.

Finally, the imposition of regulation itself will likely reduce future productivity growth in the cable industry. The 1992 Cable Act imposes substantial burdens on the cable industry, even apart from rate regulation. Compliance with these regulations will obviously not be costless.

We conclude that even <u>if</u> a satisfactory measure of total factor productivity (or any other measure of productivity) were available, there would be no reasonable basis for determining the future <u>trend</u> in productivity that might be expected.

---

through is called into question. If the resulting rates do not allow reasonable profits to be made, the benefits of benchmark regulation will be sacrificed.

D. Is there any correlation between cable system and LEC productivity, and, more cogently, between the respective changes in their productivity?

Having failed to produce a useful measure of historical productivity change, or a satisfactory analysis of what future trends might be expected, Mr. Townsend simply concludes that the productivity factor used for the LEC price cap formula should be used. The basis for this conclusion is apparently that LECs and cable companies use some of the same technologies. However, the services, architecture, technology, and operation of cable systems and LECs are so different as to render any such comparison meaningless.[16]

Figures 1A and 1B show, respectively, the classical cable system and LEC architectures. The cable architecture is designed to broadcast the same signal from the headend to all subscribers on a non-switched basis. Program selection from the spectrum of channels delivered occurs at the premises. It thus utilizes a tree and branch topology in which the same signal is delivered onto all the branches of the tree. Due to the broadband nature of the signal, broadband coaxial cable is utilized as the transmission medium. The headend, while centrally located in the topology, has the relatively minor role of cross-connecting programming signals (whether generated locally at the headend or received from other sources, such as satellite circuits) to channels on the distribution system on a relatively fixed basis.[17]

---

[16] Dr. Mark Schankerman makes the same error. See p. 20.

[17] That is, a given signal source is coupled to a particular channel over an extended period of time which is considerably longer than the duration of any one program selection by a subscriber.

Figure 1A: Traditional Cable System Distribution Architecture

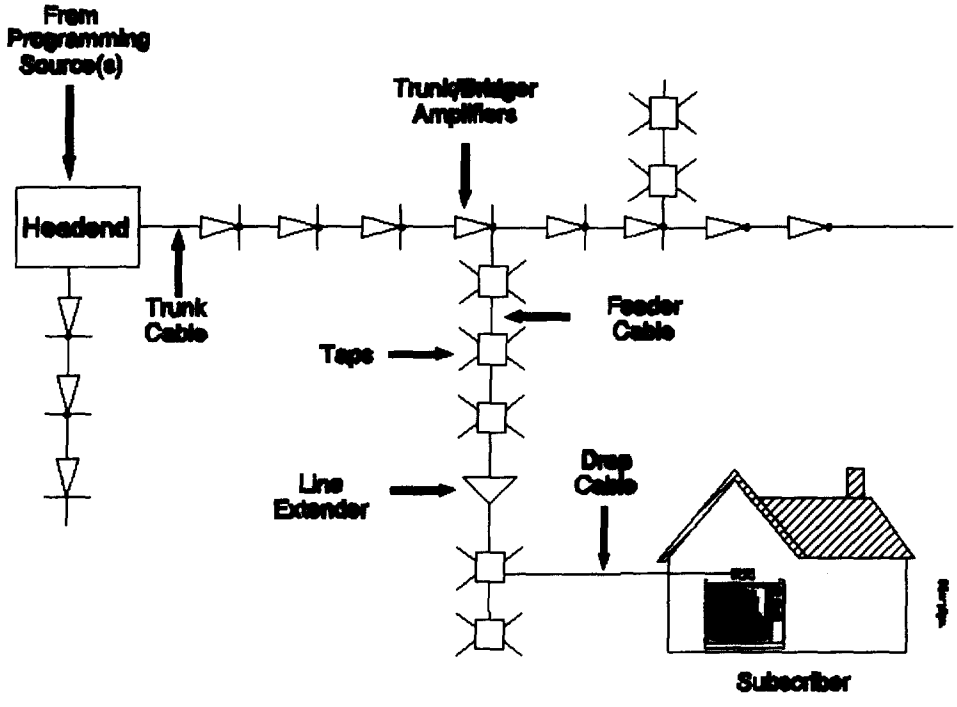
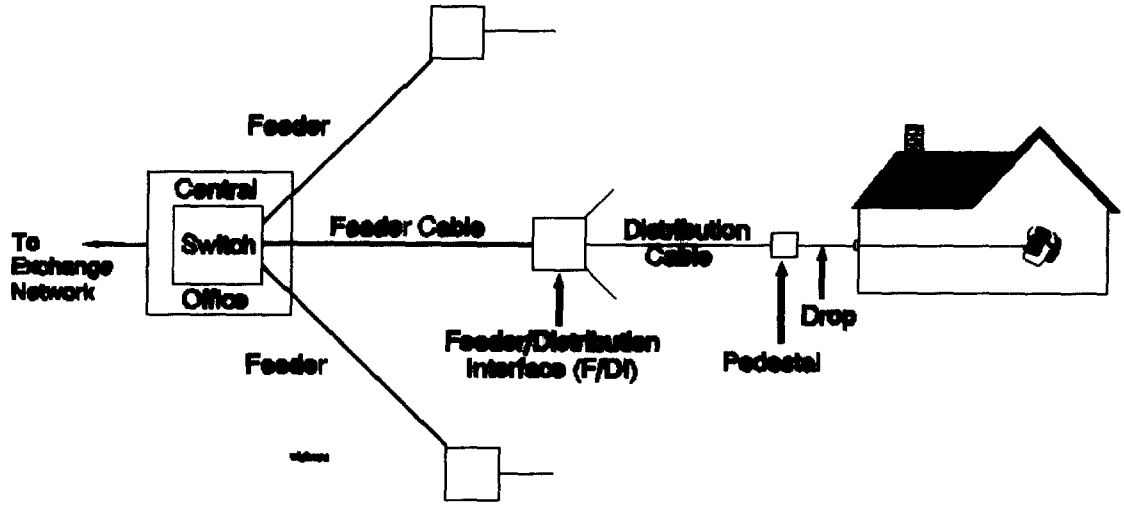


Figure 1B: Traditional Telco Distribution Architecture



By contrast, the LEC architecture transports a separate signal between the central office (CO) and each premises using a star topology.[18] In this topology, each premises has its own circuit between it and the CO. This circuit might physically be a separate wire pair, or it might be one voice channel on a digital carrier system on which a number of such channels are multiplexed. Typically, the former holds in the distribution portion of the network, while the latter is increasingly true in the feeder portion of the network.

The CO plays a central role in the architecture, as it must cross-connect a premises "loop" to another loop or the interoffice portion of the network on a demand basis, and thus includes the key switching function.[19] One of the primary differences between the cable and local exchange architectures is that the headend supports only static connections between distribution and programming sources in the case of cable, while the CO provides on-demand switched connections in the case of the local exchange.

Figures 2A and 2B show, respectively, the way in which fiber optic transmission is utilized in cable systems and the local telephone network.[20] The uses appear to be similar, although this is misleading. In each case, fiber is extended some distance from the headend/CO into the distribution network. In the cable television network it terminates at a

---

[18] Or what is sometimes called a double-star topology. There is, in effect, one star emanating from the Central Office and a second from the Feeder/Distribution Interface, as the Figure shows.

[19] That is, for the duration of a call, based on instructions received by the terminal at the customer's premises.

[20] This discussion focuses entirely on the portion of the network from the headend/CO to the premises.

Figure 2A: Fiber Deployment in Cable Network

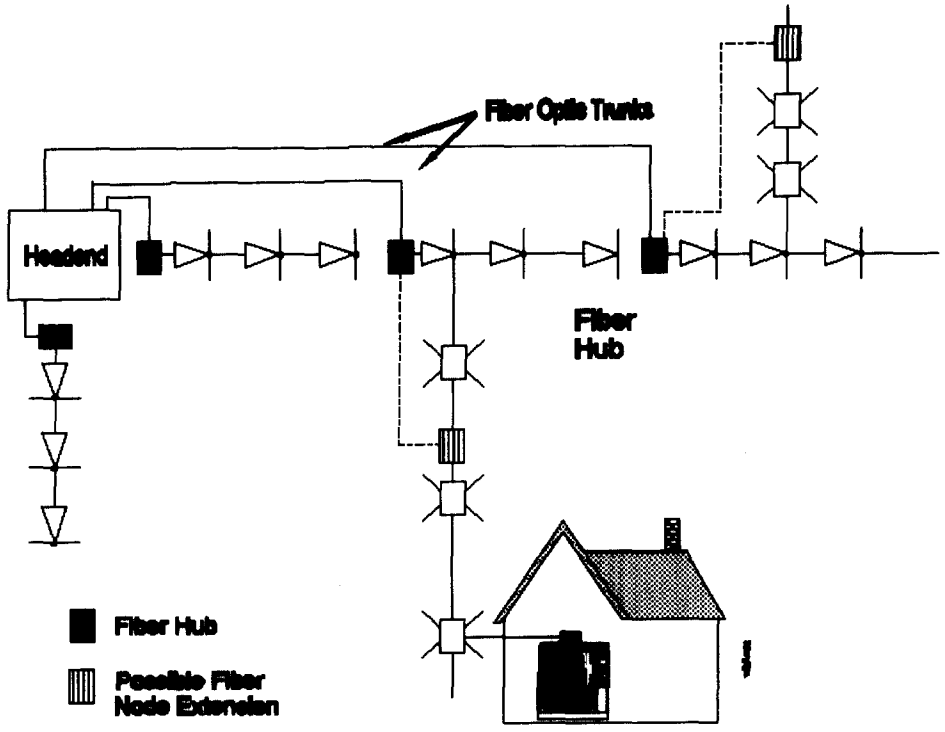
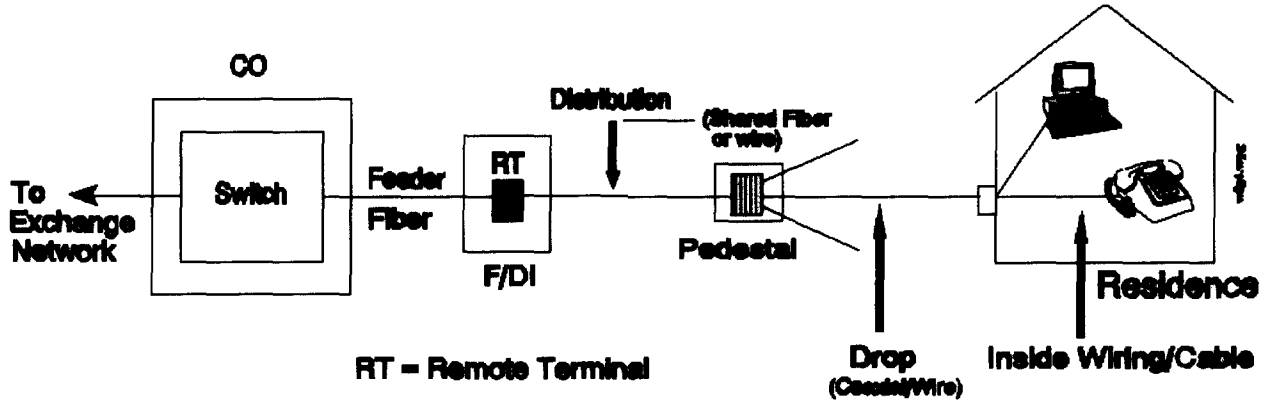


Figure 2B: Fiber Deployment in Telco Network



fiber hub, with possible extension to a fiber node located closer to the subscribers. In the LEC network, it terminates at a remote terminal at the Feeder/Distribution Interface, with possible extension to a pedestal near the subscriber premises.

But beyond this superficial similarity, fiber optics transmission is utilized quite differently in cable systems and telephone networks, at least as it is being deployed at present. In the case of a cable system, it is only a one-for-one replacement of the broadband coaxial cable as the carrier of a single broadband signal destined for all premises. Efficiency is only gained to the extent that the fiber is cheaper to install and operate than the coaxial cable.

By contrast, fiber in an LEC network is used to multiplex many individual premises signals onto a single fiber-based carrier system. To the extent that per-circuit costs are considerably lower on this fiber system than on either individual wire pairs or copper-based carrier systems, considerably greater efficiencies will result from the use of the fiber, in addition to whatever operational advantages there are for fiber versus copper-based systems.

Other significant differences between cable systems and telephone networks, and concomitant differences in productivity, are numerous. One of the major recent drivers of LEC productivity is the rapidly falling cost of switching. Moreover, LEC switching is amenable to the addition of intelligent call processing, which can increase productivity. As a final example, telephone companies can experience productivity gains through careful design of their switching hierarchy (CO and tandem switching), because they can "milk" the

productivity gains inherent in proper traffic engineering.[21] Due to the lack of switching, cable systems can not be expected to show the same productivity trends as LEC networks do in any of these regards.

The point of the foregoing discussion, is that there is little similarity between cable systems and LEC networks that would provide grounds for the naive assumption that productivity in cable systems and telephone networks should bear any relationship to one another. Nor should one expect the productivity changes due to the deployment of new technologies to be the same. Today's cable systems primarily deliver a broadband video broadcast service, using a tree and branch architecture and a non-switched headend. LEC networks support a variety of analog and digital narrowband services using a star architecture, copper wire as the primary transmission medium, and switching in the central office.[22] Such evident differences extend into the details of equipment utilized, deployment and operation of the equipment, and the like.

Much is made of the fact that LEC networks and cable systems are tending to converge towards greater commonality in services supported (a full spectrum of broadband and narrowband video and telecommunications), architecture (star topology to customer clusters, switching at a central point), and technologies (fiber optics transmission, fast packet

---

[21] In normal telephone traffic engineering, the number of calls per trunk, and hence the percentage utilization of each trunk, increases as the size of the trunk group increases. Designing the local network hierarchy to take advantage of this fact thereby increases the overall efficiency of the network.

[22] Fiber deployment in the plant of the Bell Operating Companies is limited. In 1991, less than five percent of total fiber/wire miles were fiber. See Jonathan M. Kraushaar, Fiber Deployment Update, FCC, March 1992, Table 12.

switching). This convergence is happening to some extent, although it is in its early stages at present.

In many details, the telephone networks and cable systems may remain quite different. For instance, while the LECs tout the use of Broadband ISDN, in which all services are delivered using Asynchronous Transfer Mode (ATM) or another fast packet switching technology, cable companies are considering a hybrid architecture in which existing one-way channels are delivered in a conventional fashion, while video-on-demand and other new services are delivered using a packet switching technology like ATM.[23] The cable companies are hedging their bets on the use of fast packet switching, due to its yet-unproven ability to deliver all services in an efficient, cost-effective fashion.

Even if one assumes that the ultimate architectures will be identical, that would not imply that productivity changes should be the same for telephone networks and cable systems. The two would be converging to the same end from dramatically different starting points. Therefore, the productivity changes would likely be quite different. Even the argument that once the two do converge, they should show similar productivity changes thereafter, is largely irrelevant. Convergence is not likely to be completed for many years, if not decades.

III. ECONOMIC EFFICIENCY DOES NOT REQUIRE "REGULATORY PARITY"

The underlying economic principles that should guide cable regulation are correctly stated by Dr. Emmerson:

---

[23] This hybrid architecture utilizes a single transmission medium, but the two kinds of service delivery occur in different portions of the frequency spectrum on that medium.

> ...it is important for the Commission to promote the economic efficiency associated with ompetition. Additionally, it is important for the Commission to encourage an optimal rate of development for new products and services and the optimal rate of adoption of new technologies.[24]

However, the "regulatory parity" advocated by Dr. Emmerson will actually make these goals more difficult to achieve. Unnecessary regulation, whether applied to LECs or to cable companies, will reduce economic efficiency by increasing costs and introducing distortions.[25] This underlying fact has guided the Commission in a series of deregulatory activities undertaken over the past two decades.

Dr. Emmerson's efficiency concerns are apparently grounded in the fear that cable companies will provide traditional local exchange services at inefficient prices or that LEC provision of traditional cable services will be unfairly handicapped. This fear is ungrounded because the two industries face radically different market incentives.

A. Cable Companies Will Not Have Incentives to Price Local Exchange Services Inefficiently

A large part of Dr. Emmerson's concern is apparently that the cable industry will compete unfairly as it enters the local telephone business. For example, he recites the traditional concerns that occur when regulated monopolists enter new markets. Chief among these concerns is cross-subsidy. There are several reasons why this will not be a concern.

As Dr. Emmerson recognizes, cross-subsidy requires that a firm disguise above cost prices in less competitive markets through cost misallocation in order to reduce the price in

---

[24] P.1.

[25] See Daniel Kelley, Economics of Cable Television Regulation, filed with Comments of Time Warner, January 27, 1993, pp. 17-19.

the competitive market. This strategy is rational only when prices in the less competitive market are constrained by rate of return regulation, which is not the primary means by which the Commission intends to regulate the cable industry. Instead, the Commission has adopted benchmark regulation as its primary means of regulating the cable industry.

Under benchmark regulation, prices are established through comparisons with prices established in markets that the Congress has determined to be subject to competition. Firms subject to benchmark regulation will have no incentive to underprice local exchange services because such actions will not affect the benchmark rate. Thus, the incentives for inefficient pricing that Dr. Emmerson discusses will be largely absent from the cable industry.

Rate of return regulation will be a backstop form of regulation in cases where benchmark rates are inadequate for particular firms. It is logically possible that a cable company might have an incentive to show that costs incurred to provide services that are not regulated under the Cable Act should be recovered from customers of regulated cable services or equipment in order to achieve prices above the benchmark. However, this is unlikely. Rate cases will be expensive and time-consuming. Cable operators are not likely to resort to the risky and expensive rate regulation process in order to engage in anticompetitive cross-subsidy in local exchange markets.[26] Review of the comments filed in this proceeding shows that the cable industry is not anxious to embrace rate of return regulation. The focus of many companies is to find ways to improve or build on the benchmark process so that rate cases can be avoided.

---

[26] Once a rate of return proceeding is begun by a cable operator, it is possible that the Commission or a local regulator could find that rates should be reduced below the benchmark.

In those cases where a cable operator elects to forego benchmark regulation for rate of return regulation, the LECs will have achieved effective regulatory parity. Rates and cost allocations will be subject to review, most likely using traditional rate of return concepts similar to those traditionally applied to the common carrier industry. This is precisely why it is important that the benchmark rates are set correctly.

As Dr. Mark Schankerman has pointed out in his statement on behalf of GTE, "if the benchmark procedure is crude, cable operators will be far more likely to apply for relief under cost of service procedures which would destroy both efficiency incentives and administrative simplicity."[27] Therefore, if benchmark regulation is to be successful in providing consumer benefits while at the same time reducing the need to engage in rate of return regulation of the cable industry, then some changes in the approach adopted by the Commission are necessary. Dr. Schankerman advocates the use of additional explanatory variables in the benchmark formulation.[28]

It is not clear why the LECs that sponsored Dr. Emmerson's Affidavit would be concerned even if cable companies were to succeed in raising regulated cable prices. These companies view themselves as potential entrants into cable markets and should therefore welcome the higher prices. On the other hand, it is extremely unlikely that telephone companies would fear below cost pricing from cable companies that provide local exchange substitutes. The cable companies will likely not be regulated in local exchange markets to

---

[27] See p. 7.

[28] Id. Also see Lewis J. Perl, Paul S, Brandon, John H. Landon, and Anna P. Della Valle, "A Proposal for Backstop Regulation for Cable Television Prices," filed with the Comments of Time Warner.

the same extent as the LECs. Therefore, they will have no incentive to price at inefficiently low levels. The source of the LECs' concern is more likely that they do not want local exchange competition from the cable companies. Raising the costs of cable companies through forcing them to incur more regulatory burdens will help accomplish that result.

Another factor making it unlikely that cable companies will pursue rate cases in order to charge unreasonably high prices is that LECs are not the only source of competition for cable operators. Cable faces significant competition from, among other sources, free over the air programming. Cable penetration is less than two thirds of television households. The Cable Act of 1992 was itself designed to encourage competition for cable by making programming more widely available to alternative suppliers, such as potential overbuild systems, DBS, MMDS, and new wireless cable technology in the 28 GHz band. Therefore, cable operators are constrained in their ability to extract higher prices from their customers, and this is especially so on a going-forward basis. This will limit the number of attempts to forego benchmark regulation for rate cases, and in the longer run will lead to the elimination of all cable rate regulation, and the distortions it causes.

B. LECs Do Have Incentives to Price Their Services Inefficiently

Concerns over LEC cross-subsidy in cable markets are real.[29] LECs have incentives to misallocate costs in order to underprice their own broadband transmission services. This would harm existing broadband video providers such as cable, wireless cable (MMDS) and

---

[29] Indeed, the Commission's own rules may themselves lead to cross-subsidy, if not modified. See Daniel Kelley, Cross-Subsidy Concerns Raised by Local Exchange Carrier Provision of Video Dialtone Services, March 29, 1993 (filed with NCTA/CFA Petition for Rulemaking).

Direct Broadcast Satellite. As a result, LECs would capture broadband transmission market share, even if they are not the most efficient providers. This strategy would be costless if monopoly service prices could be increased or, what amounts to the same thing, price reductions for these services could be avoided or reduced. The fact that cable companies and their increasingly sophisticated systems present a potential threat to the LEC monopoly over narrowband transmission provides another incentive for cost misallocation and cross-subsidy.

Unfortunately, it is not possible to remove LEC regulation-induced incentives to behave anticompetitively by simply deregulating the LECs. The LECs have a bottleneck monopoly over an essential service. Removing regulation will subject consumers to substantial risk of monopoly pricing. Removing the Commission's set of competitive safeguards will likely subject competitors of the LECs to cross-subsidy. The Commission and many state regulators have experimented with various ways to modify LEC regulation. Virtually none of these regulators has felt sufficiently confident to eliminate rate of return oversight altogether.

By contrast, rate of return regulation is not being used as the primary means of regulating cable companies. The Commission has found that rates charged by systems that are defined as effectively competitive by the 1992 Cable Act can provide a benchmark against which rates can be compared. No such benchmarks are available for telephone companies since they retain their monopolies.

There may be a legitimate concern that regulation may prevent LECs from responding to competition. However, that is not an issue in this proceeding. Appropriate cost allocation

and cost floors should be implemented and a transition path for deregulating telephone companies as competition develops should be designed.

C. "Regulatory Parity" is Not Valuable for Itself

In the Competitive Carrier proceedings, the Commission recognized that non-dominant interexchange carriers do not have the ability to price unreasonably or to discriminate in long distance telecommunications markets. In a series of actions taken over a period of years, the Commission undertook the systematic deregulation of non-dominant carriers. As the success of its procompetitive policies became apparent, reduced regulation was extended to the dominant carrier.

The objective throughout this process was not "regulatory parity." The objective was economic efficiency and competition, which required that regulation be tailored to the unique circumstances of each class of competitors.[30] This process has clearly promoted economic efficiency and competition. Competition in the long distance market is established and consumers have reaped the rewards.[31] Meanwhile, substantial regulatory resources have been saved.

When applied to the current situation, these principles suggest that cable companies should be accorded non-dominant status as they enter new telecommunications markets. As discussed above, they will have little or no incentive to price inefficiently in telephone markets under benchmark regulation. To the extent that rate of return regulation applies,

---

[30] The Courts have recently held that the language of the Communications Act does not allow detariffing of common carrier services offered by non-dominant carriers.

[31] See letter to Senator Daniel K. Inouye from Thomas H. Norris, Vice President, Federal Government Affairs, AT&T, August 2, 1993.

they will have to justify cost allocations. There is obviously no concern that they will charge monopoly prices when competing with regulated telephone companies.